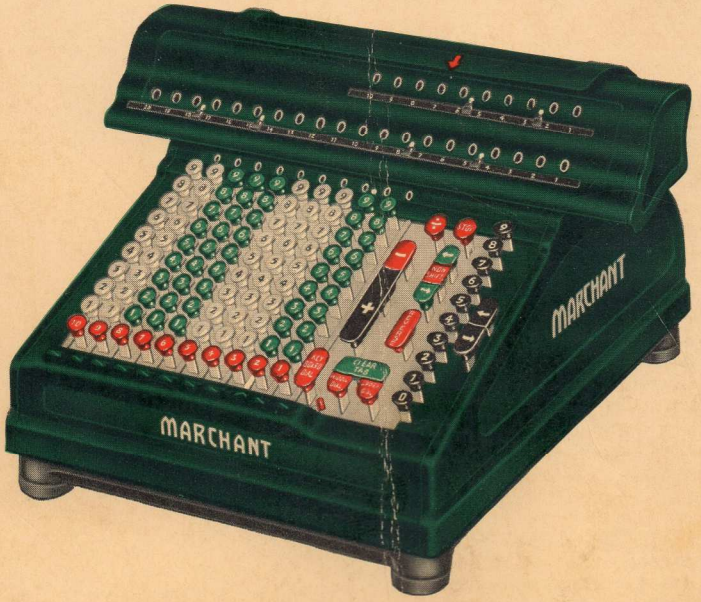

OPERATING INSTRUCTIONS

MARCHANT Calculators

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OPERATING INSTRUCTIONS

MARCHANT

CALCULATORS

EXEMPLIFYING UNPRECEDENTED

"Silent Speed Supremacy"

THE CONTRIBUTION OF

MARCHANT CALCULATING MACHINE COMPANY

OAKLAND, CALIFORNIA, U. S. A.

FOREWORD

"In character, in manners, in style, and in all things, the supreme excellence is simplicity."
—LONGFELLOW

Simplicity of operation is fundamental in the new *Silent Speed* Marchant. No prior experience or long training period is required.

The simple operating instructions outlined herein will enable the inexperienced operator to master all the essentials of operation and application involving Addition, Subtraction, Multiplication and Division, and their various combinations, with a few minutes of practice.

So that your *Silent Speed* Marchant may serve you to the fullest extent we urge you to become familiar with its many operating advantages and their application to your figure work.

It will handle your figuring problems as efficiently, accurately and speedily as it is now solving those of every type of business all over the world.

For detailed instructions on how to solve problems particularly adapted to your business, or for any special assistance desired in the handling of your figure routine, call your local Marchant representative, or write direct to

MARCHANT CALCULATING MACHINE COMPANY
HOME OFFICE: OAKLAND, CALIFORNIA, U. S. A.

Sales Agencies and Manufacturer's Service Stations in All Principal Cities

LEADERSHIP

Your *Silent Speed* Marchant Calculator is the world's fastest calculator. It operates with unchallenged ease and simplicity, and with a control of accuracy of the entered factors and of the answer calculated from them that is not equalled in the calculator art.

For thirty years Marchant has successfully pioneered for greater efficiency in handling figure work. The genius and manufacturing excellence of Marchant engineers first introduced to mechanical calculating many features which are today accepted as standard. Many additional features, exclusive with Marchant, have been added. They combine to offer in Marchant *Silent Speed* Calculators the greatest value and performance in calculator history.

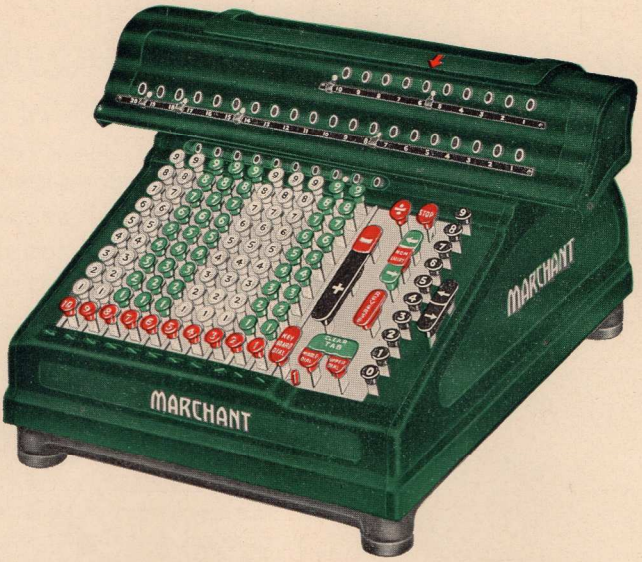
Marchant's long experience in the calculator field assures every user the finest of material and workmanship. Every known test and inspection of stability and quality are expertly applied. To this patient precision in manufacturing, Marchant owes its unfailing accuracy and permanent durability.

GUARANTEE

Every purchaser of a Marchant is guaranteed free service for twelve months; but the Marchant is designed to give continuous performance throughout many years. After the first year purchasers may, if desired, and for a modest annual payment, enjoy continued service guaranteeing protection against all contingencies.

SERVICE

Marchant sales and service is world-wide. Mechanical service by factory trained technicians is available at Marchant offices in all principal cities of the United States, assuring long economical life and satisfactory performance under all conditions.



MODEL CT-10 M (WITH SELECTIVE CARRIAGE TABULATION)

Full Automatic Multiplication and Division Silent Speed Calculator

This model represents the highest development in the calculating machine art and establishes a new standard of efficiency and performance in the handling of all figure work. It automatically performs all calculations quietly, with marvelous ease and unprecedented speed.

In addition to the many other features which are exclusive and standard in all Marchant calculators, it has the Accuracy Controller*, Selective Carriage Tabulation, Automatic Counter Control, Automatic Two-Way Carriage Shift, and it multiplies automatically by any factor that is entered in the Single Row Keyboard, the answer being formed concurrently with entry of multiplier.

MODEL M

Full Automatic Multiplication and Division Silent Speed Calculator

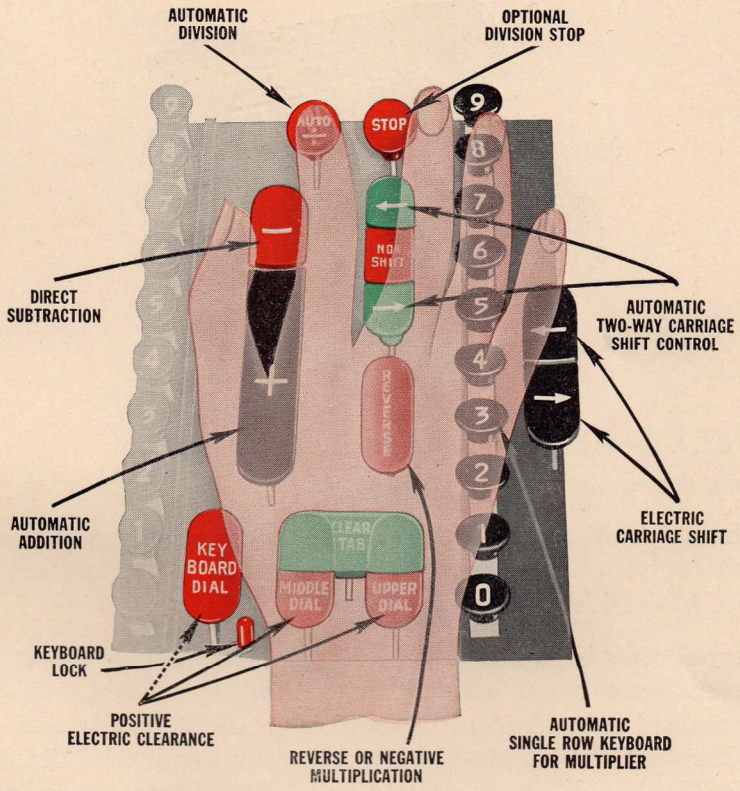
This is similar to Model CT-10M illustrated above except that it does not have Selective Carriage Tabulation.

These new *Silent Speed* Marchants are extremely attractive, streamlined, compact, light and portable, with a permanent durability that assures long and satisfactory service.

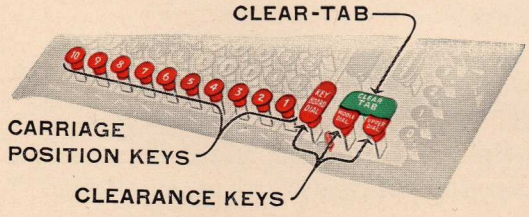
**For elements of the ACCURACY CONTROLLER see back cover page.*

MODEL CT-10M *ONE-HAND* KEYBOARD CONTROL

Model M Control is similar

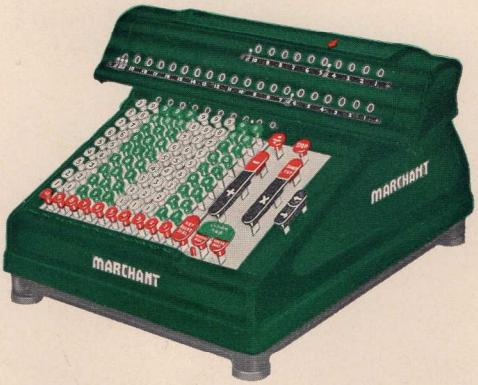


Automatically operated by control keys under the finger-tips of either hand, Marchant gives instant results with new simplicity and unquestioned ease of operation . . . with a full and complete elimination of nerve strain and fatigue.



Model CT-10M also has Selective Carriage Tabulation controlled by keys illustrated at left.

MARCHANT



MODEL CT-10 D (WITH SELECTIVE CARRIAGE TABULATION)

Automatic Division Silent Speed Calculator

With all operations keyboard controlled under the finger-tips of one hand, this outstanding calculator quietly and quickly performs all types of figure work with the greatest of ease.

Its superiority is emphasized by its smoothly flowing *Silent Speed* mechanism. Exceptional features comprise individual Add and Subtract Bars separated from the Multiplying Bars, Automatic Division, Automatic Counter Control, Selective Carriage Tabulation, and the *ACCURACY CONTROLLER* . . . consisting of True Figure Dials for all 3 Factors, Perfect 3-Dial Alignment, Red Carriage-Position Indicator, Pre-Set Decimal System, and Complete Capacity Carry-Over.

MODEL D

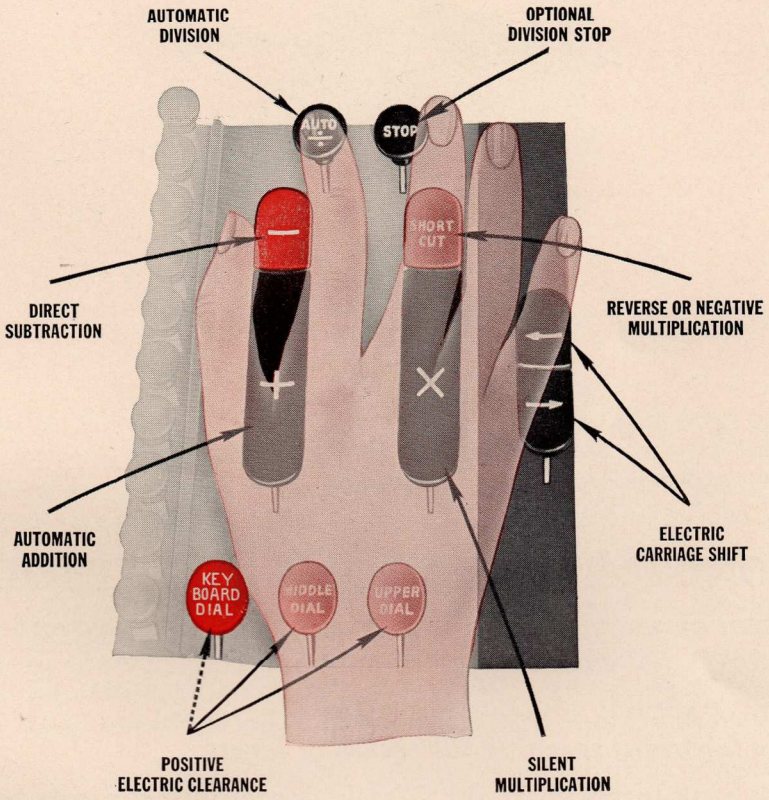
Automatic Division Silent Speed Calculator

This is similar to Model CT-10D, illustrated above, except that it does not have Selective Carriage Tabulation.

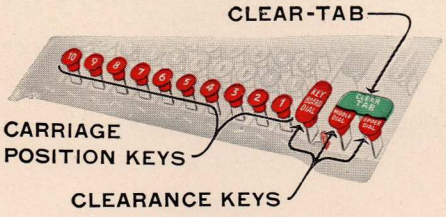
These models are compact, light and portable, and their attractive streamlined appearance magnificently portrays Marchant excellence.

MODEL D *ONE-HAND* KEYBOARD CONTROL

Model CT-10D Control is similar



The *Silent Speed* Marchant presents a compact keyboard control hitherto unknown, permitting complete operating control under the finger-tips of either hand. Marchant's simplicity of control sets new and unequalled standards of calculator performance, giving maximum results with a minimum of operating effort.

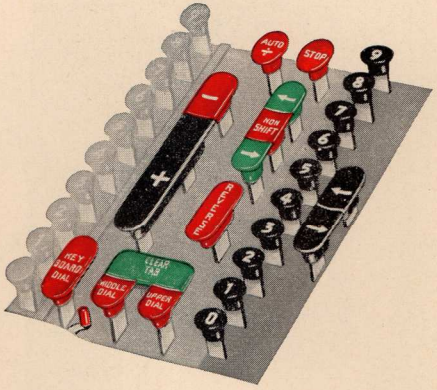


Model CT-10D also has Selective Carriage Tabulation controlled by keys illustrated at left.

OPERATING INSTRUCTIONS

FOR

"Silent Speed Supremacy"



ONE-HAND KEYBOARD CONTROL

Every operation of the *Silent Speed* Marchant is governed by Control Keys, which are compactly and conveniently grouped under one hand.

No laborious reaching for cranks or levers.

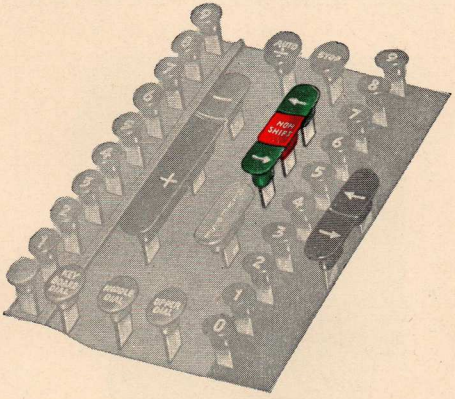
No hand travel necessary. Merely depress the key indexed for the function you wish performed.

This makes every calculation, be it simple or intricate, easy and obvious, even to the novice.

All operations are performed electrically for the greatest ease of the operator. Interlocking safety devices automatically prevent the depression of any key that would interfere with any operation in progress.

This is indeed "Keyboard Controlled" under the finger-tips of one hand, left as easy as right!

AUTOMATIC *TWO-WAY* CARRIAGE SHIFT



To direct Carriage Shift in Automatic Multiplication, merely depress the green key with arrow pointing the direction you wish the carriage to travel. To reverse carriage travel, depress the other green key. To hold the carriage stationary, depress red Non-Shift Key. Depression of one key automatically releases the other.

In going from Multiplication to Division, or vice versa, the carriage operation is entirely automatic. No preparation necessary!

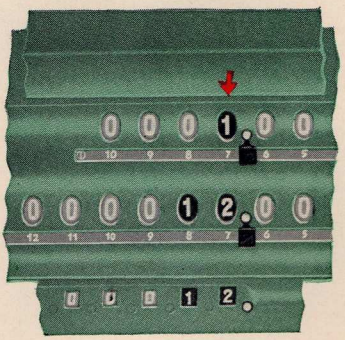
During Division, *the carriage automatically shifts in the proper direction,* regardless of green key indication or type of previous operation.

To move the carriage without other operations, depress either of the black Electric Carriage Shift Bars on the right and the carriage will smoothly glide in the direction the arrow indicates.

Models having Selective Carriage Tabulation permit carriage to be shifted to any position by merely depressing one of the red Carriage Position Keys indexed for the position to which it is desired the carriage be shifted. This shift may also be made automatically at time of clearing any or all dials.

RED *CARRIAGE-POSITION* INDICATOR

(One of 5 parts of THE ACCURACY CONTROLLER)



Marchant has completely eliminated all effort and loss of time by the operator in determining in which Upper Dial the next operation will occur.

Regardless of carriage position, at all times a conspicuous and unique *red arrow points directly to the Upper Dial that will operate.* This automatically indicates operating position and assures immediate selection of the proper dial.

There is no searching for operating position—no nerve strain guessing which dial will operate.

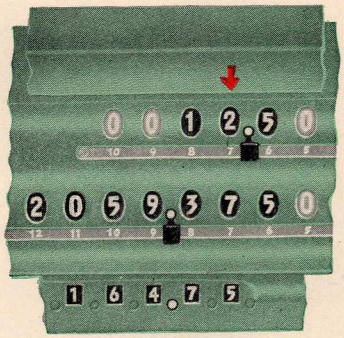
COMPLETE CAPACITY CARRY-OVER

(One of 5 parts of THE ACCURACY CONTROLLER)

This feature is indispensable to any calculator user. The smoothly flowing carriage mechanism makes all dials active—no figures are lost by inadequate carry-over capacity. Irrespective of carriage position, *the correct answer to any problem is assured* to full capacity of the dials.

TRUE FIGURE DIALS FOR *ALL 3* FACTORS

(One of 5 parts of THE ACCURACY CONTROLLER)



Dials for all factors, including keyboard set-up, are closely grouped in perfect 3-Dial Alignment. *Each and every operation performed on the calculator is recorded in one or more of these three dials.*

UPPER DIAL

In this dial is recorded the Multiplier in Multiplication, the Quotient in Division, and the Count of Items in Addition or Subtraction.

MIDDLE DIAL

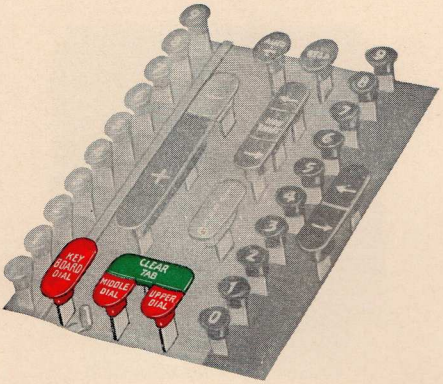
In this dial is recorded the Product in Multiplication, the Dividend and Remainder in Division, the Sum in Addition, and the Remainder in Subtraction.

KEYBOARD DIAL

By means of this outstanding feature, *every figure set on the keyboard instantly appears in a straight line in the Keyboard Dial,* entirely eliminating "zig-zag" reading of depressed keys.

All three factors, including keyboard set-up, appear in full review upon completion of every multiplication. This permits not only instant checking of the operator's entry of the figures, enabling immediate correction to be made either during or after entry, but it also gives proof of posting and transcribing if *all* factors are copied *from the dials* to the final work and the latter then visually compared with original figures from which calculation was made. *This is Double Entry calculating and provides unmatched accuracy control.* (See Page 37.)

POSITIVE ELECTRIC CLEARANCE



Certainly the most frequent and usually the most difficult task with the ordinary calculator is complete clearance of the entire machine.

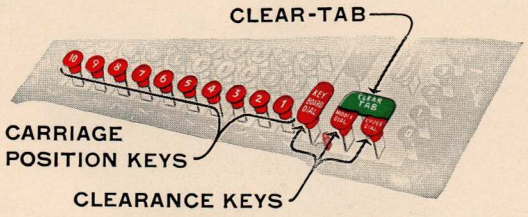
Dial clearance being constantly necessary, either before or after each calculation, it should be instant, easy and positive.

Marchant has perfected *the most convenient Positive Electric Clearance*—operating from the keyboard by the feather touch of a key, *regardless of carriage position.*

These positive electric Clearance Keys are conveniently grouped to permit instant and complete clearance of the keyboard and all dials simultaneously—*a single one-hand operation*—or any one or more factors selected may be cleared at will in accordance with the key-top indexing.

Release of any keyboard key may be obtained by touching the key at the bottom of the column; or on the CT-10M and CT-10D models, by momentarily holding down any two keys in the column against slight spring compression.

SELECTIVE CARRIAGE CONTROL



A single touch of Clear-Tab Key *automatically tabulates carriage to next starting position,* either *with or without simultaneous clearance of any or all dials.*

The position to which carriage will tabulate is predetermined by depression of any one of a row of red Carriage Position Keys arranged horizontally at the bottom of the keyboard and numbered to correspond with carriage positions as marked on Upper Dial. A full depression of the red Carriage Position Key causes carriage to tabulate instantly; a partial depression (until it "clicks"), causes carriage to tabulate only when Clear-Tab is touched.

It is not necessary to reset the Carriage Position Key for subsequent tabulations to the same position upon later depressions of Clear-Tab Key.

MANUAL COUNTER CONTROL

The Manual Counter Control is located at the extreme upper right corner of the keyboard, and is in normal position when inclined away from the operator.

With this control in that normal position, the Upper Dial automatically records the Multiplier or the Quotient in "true" figures.

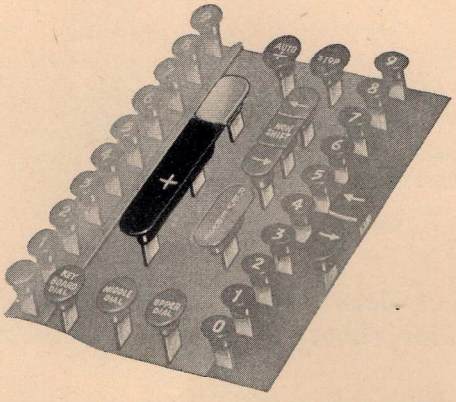
When the control is moved toward the operator the Upper Dial will record the complement of the Multiplier or Quotient, as the case may be. In Reverse Multiplication with this setting the negative Multiplier is recorded in "true" figures.

FLEXIBLE *SINGLE KEY* DEPRESSION

The *Silent Speed* Marchant is equipped with a *positive flexible keyboard,* which *prevents setting more than one key in the same column at the same time.*

To change any digit set in the Keyboard Dial, depress the key with the desired digit in the column in which the change is to be made. This will automatically release any other key in that column and at the same time change the reading of the Keyboard Dial.

AUTOMATIC ADDITION



Set each item in Keyboard Dial and lightly touch the Add Bar. It is not necessary to pre-condition the calculator to make it suitable for addition even though it may have previously been multiplying or dividing. *Marchant's Automatic Addition is always ready!* The correct total is always visible in the Middle Dial, and the number of items is counted in the Upper Dial, regardless of how slow the operator may be in releasing the Add Bar, for an exclusive Marchant feature automatically limits the number of cycles when the Add Bar is used.

Each item as set up appears in Keyboard Dial, giving a *visible check* and permitting any change before the item affects the total. As each number is added, the Keyboard Dial automatically clears ready for the next entry.

Example of Marchant Normal Automatic Addition:

225
665
715
823
747
———
3175

With carriage to the extreme left, Red Carriage-Position Indicator above Upper Dial "1," set 225 at the right of the keyboard. It is instantly visible in a straight line in the Keyboard Dial. A touch of the Add Bar then adds this figure into the Middle Dial and automatically clears it from the Keyboard Dial. Now place 665 in Keyboard Dial; again touch the Add Bar. Repeat the process until all five numbers have been added. The total of 3175 appears in the Middle Dial, and the number of items, 5, in the Upper Dial.

AUTOMATIC *REPEAT* ADDITION

Automatic Repeat Addition is accomplished by depressing the Add Bar simultaneously with the key of the Single Row Keyboard that indicates the number of times the item is to be repeated.

Marchant automatically counts, repeats the additions, and clears the Keyboard Dial.

Example:

3503	Place 3503 in Keyboard Dial; touch Add Bar. Place
6890	6890 in Keyboard Dial; touch Add Bar. Place 2356 in
2356	Keyboard Dial and simultaneously depress the Add
2356	Bar and the "4" key of the Single Keyboard Row.
2356	2356 will be automatically added four times and
2356	cleared from the Keyboard Dial, leaving the calculator
1653	ready for the next operation.
1022	
22492	*On Model D, use the Multiplier Bar for repeated additions, checking with Upper Dial Item Counter.*

AUTOMATIC *LOCKED FIGURE* ADDITION

This method permits the number that is being added to remain in the Keyboard Dial after it has been added, which is desirable in some types of work, such as, for example, when the amount so added is to be multiplied by a factor or used as a divisor after the addition.

In this case the "1" key of the Single Row Keyboard is depressed (or X Bar of Model D is touched) instead of touching the Add Bar. The Non-Shift Key of Model M should normally be down when this method is used.

The locked figure method of addition is not recommended, except in the special cases where it is needed, because every cipher of the number being set up in the Keyboard Dial must be produced by separately clearing a digit from the previous set-up. If the Marchant normal method is used, such ciphers are automatically produced by clearance of the previous number when the Add Bar is depressed, it being only necessary to set up the digits 1 to 9 inclusive. This saves 10% of the key depressions. The locked figure method is also not recommended on *any* bar type model (such as our D), except in the case of the special problems that demand its use, because it requires that extra care be taken to touch X Bar so only one revolution will take place. If the bar is depressed too long, more than one addition of the number will be made.

USEFUL HINTS FOR ADDITION

ADDING A CONSTANT

If totals are being accumulated at several sections of the Middle Dial, such as in dual addition (see below), an amount may be added to more than one of the totals by shifting the carriage so the total appears directly above the amount in Keyboard Dial that is to be added. If the "locked figure method" be used, the Constant may be added to each total by shifting the carriage so it comes beneath each group in succession. It may be added to the last group by a depression of the Add Bar, which simultaneously clears the Keyboard Dial.

ADDING TO A CONSTANT

With Non-Shift Key depressed, add the Constant into the Middle Dial. Place the first number to be added to it in Keyboard Dial and touch "1" key of Single Row Keyboard (or on D models touch X Bar). Copy answer. Depress Subtract Bar to restore the Constant in the Middle Dial.

DUAL ADDITION *(Method A)*

When numbers are small, the extreme left of the Keyboard Dial may be used for adding one column and the extreme right for adding a second column, one depression of the Add Bar sufficing for both additions.

DUAL ADDITION *(Method B)*

When the numbers are large, the set-ups in the Keyboard Dial are made at the right and the numbers are added to either of two groups in the Middle Dial. The first group accumulates at the right of the Middle Dial when the carriage is shifted to extreme left. The second group accumulates at left of the Middle Dial when carriage is shifted to extreme right. This method is useful for accumulating debits and credits separately as a ledger page is being scanned. Marchant's Selective Carriage Tabulation is indispensable in shifting the carriage back and forth in such work.

SIMULTANEOUS KEY DEPRESSION

Those having much adding to do will save time by setting up amounts by a single depression, grouping the fingers so that even large numbers may be set up by a single downward stroke. At instant of releasing fingers that are over the keyboard, the little finger of the right hand touches the Add Bar. Those who are skilled in listing machine operation by the plan of "running up the keyboard" will also find the Marchant well adapted to such a method.

INTERRUPTIONS

The Upper Dial is an item counter which should be cleared as each page is turned. It will then show the number of items added. If interrupted, depress keys for the next number but do not touch Add Bar. The location of the number can always be identified on the page because it is one more than the reading of Upper Dial.

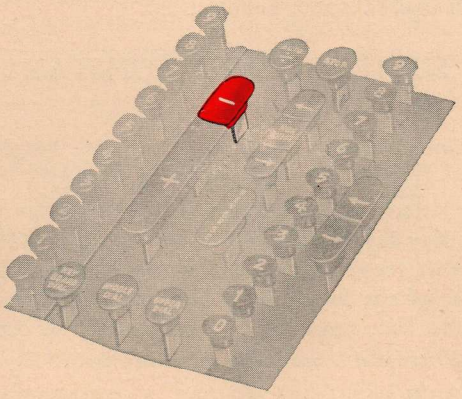
ACCURACY CONTROL

Marchant's Accuracy Controller provides the same visual proof as is obtained with a listing machine. The audit principle is the same, except Marchant visual comparison is made at time of entry instead of after completion of all entries.

CORRECTION OF IMPROPER SET-UPS

The Keyboard Dial enables quick glance checking of all entries. To correct, it is only necessary to depress the key showing the correct digit in the column that bears the incorrectly set digit. *This may be done during or after entry, but before addition is made.*

DIRECT SUBTRACTION



Example of Marchant Normal Automatic Subtraction:

3175	Add 3175. Set 655 in Keyboard Dial; touch the red
— 655	Subtract Bar. The remainder, 2520, will instantly ap-
———	pear in Middle Dial, and the Keyboard Dial auto-
2520	matically clears.

AUTOMATIC *REPEAT* SUBTRACTION

Automatic Repeat Subtraction is performed in the same manner as Automatic Repeat Addition (Page 15), except by depressing the Subtract Bar instead of Add Bar.

Example:

7406	Place 7406 in Keyboard Dial; touch Add Bar. Con-
3503	tinue with the three succeeding items to be added.
6890	Place 2356 in Keyboard Dial; depress simultaneously
1022	the Subtract Bar and "4" key of the Single Row Key-
—2356	board. 2356 will be automatically subtracted four
—2356	times and cleared from the Keyboard Dial, leaving the
—2356	calculator ready for the next operation.
—2356	
1655	
———	*On Model D, use the Short-Cut Bar for repeated sub-*
11052	*tractions, checking with Upper Dial Item Counter.*

AUTOMATIC *LOCKED FIGURE* SUBTRACTION

When it is desired to have the number being subtracted remain in Keyboard Dial, the "locked figure" method is followed in the same way as described for the corresponding plan of Addition, except that the Reverse Bar is depressed prior to touching "1" Key of Single Row Keyboard (on Model D touch Short Cut Bar).

USEFUL HINTS FOR SUBTRACTION

As Subtraction is similar to Addition, many of the useful hints relating to Addition apply with equal force to Subtraction.

SUBTRACTING A CONSTANT

Example:

Find Net Weight.

Gross Weight	*Tare*	*Net Weight*
1250	110	1140
2625	110	2515
1468	110	1358

With Non-Shift Key depressed, subtract the Constant, 110. Place in Keyboard Dial the amount, 1250, from which the Constant is to be subtracted. Add by depressing the "1" key of the Single Row Keyboard, and read answer in Middle Dial. Depress Subtract Bar, restoring the constant (in its complementary form).

On Model D use X Bar instead of the "1" Key.

SUBTRACTING FROM A CONSTANT

Example:

125.50 — 26.40 = 99.10
125.50 — 87.50 = 38.00
125.50 — 50.40 = 75.10

With Non-Shift Key depressed, add the constant, 125.50. Place in Keyboard Dial the first number to be subtracted, 26.40. Subtract by depressing Reverse Bar and "1" key of Single Row Keyboard, and read answer in Middle Dial. Depress Add Bar, restoring the constant.

On Model D use Short-Cut Bar instead of Reverse Bar and "1" Key.

BALANCING DEBITS AND CREDITS

Add the debits and credits, using Dual Addition (Method A or B), adding debits at left of Middle Dial and credits at right. Set up in Keyboard Dial whichever of the two totals is the smaller. Shift carriage so as to bring this set-up directly below other total, and subtract. Copying the total to the Keyboard Dial may be expedited by shifting carriage so the amount to be transferred to Keyboard Dial is directly above where it is to be located in Keyboard Dial. This alignment of dials permits instant visual comparison to insure correctness of transfer; or, as a double check, a depression of Reverse Bar and "1" key of Single Row Keyboard clears Middle Dial. If it should not clear to ciphers, an error in transferring was made.

SUBTRACTING WHEN SMALLER AMOUNT IS IN MIDDLE DIAL

With Non-Shift Key depressed, duplicate the Middle Dial amount in Keyboard Dial and depress Reverse Bar and "2" key of Single Row Keyboard. Change Keyboard Dial reading to that of the larger number and touch Add Bar. The desired remainder appears in Middle Dial.

On Model D, use the Short Cut Bar, touching it twice, instead of the "2" key.

CONTINUING ADDITION AND SUBTRACTION

It is obvious that any number may be either added or subtracted, depending upon whether the Add Bar or Subtract Bar is depressed. Balancing of debits and credits need not be made by totaling each, provided such totals are not needed, as the balance can be directly obtained by adding debits and subtracting credits as they occur. When there is a credit balance it appears in a negative form, which must be evaluated as a true figure amount as below:

FINDING THE TRUE VALUE OF A NEGATIVE NUMBER

In the following example the total credits exceed the total debits. The result is a credit balance. This negative total appears in Middle Dial. It may be changed to the "true" figure amount by "writing" 76 and one or more of the 9's to its left in the Keyboard Dial, and subtracting twice by depressing Reverse Bar and "2" key of the Single Row Keyboard.

On Model D, touch Short-Cut Bar twice instead of Reverse Bar and "2" Key.

Example:

	Credit Balance	
	82	Dr.
	—97	Cr.
	24	Dr.
	—33	Cr.
Middle Dial	9999999999999976	Negative Total
Keyboard Dial	—9976	Subtract Twice
Middle Dial	24	True Credit Balance

UPPER DIAL ADDITION OR SUBTRACTION

It is often desired to add to or subtract from amounts that may be in the Upper Dial. This may be done by having a clear Keyboard Dial and multiplying or reverse multiplying by the amount that it is desired to add or subtract (see Page 22).

INTERMINGLING TYPES OF CALCULATING

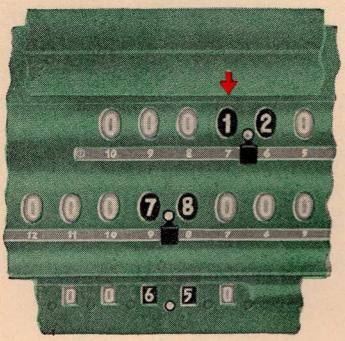
Marchant designers have given meticulous attention to making it simple and easy to operate the Marchant when it is necessary to change back and forth between addition, subtraction, multiplication, and division. This is especially desirable because of the constant intermingling of these types of figure work in modern offices.

To accomplish this it will be observed as this book is studied, that it is not necessary to pre-condition the calculator in any way, such as by altering the position of "repeat-keys" and the like, when changing from one type of calculating to another. If the Upper green Carriage Shift Control Key is kept continually down, and multipliers in multiplication are entered in the usual way "from the left" (see top of Page 22), the Marchant will add or subtract by either the normal or the "locked figure" method, and multiply or divide without it being necessary to touch a single pre-conditioning key. The Marchant is Always Ready!

PRE-SET DECIMAL SYSTEM

(One of 5 parts of THE ACCURACY CONTROLLER)

All three Dials and Keyboard have conspicuous white decimal markers. Pre-setting these eliminates guesswork and error in correctly pointing off the result.



The simplest method of setting decimals is one which requires minimum mental effort on the part of the operator.

1. Determine the number of decimals necessary for the keyboard factor. Flip over the Keyboard Guide at that position. This automatically sets the decimal in Keyboard Dial.

2. Set Upper Dial decimal a sufficient number of positions from the right to accommodate that factor. Your type of problem has definitely directed the setting of decimal points in the two factors above.

3. Position the carriage so that Red Carriage-Position Indicator points to the first dial to the left of the decimal in Upper Dial. Then set Middle Dial decimal immediately above the decimal in Keyboard Dial.

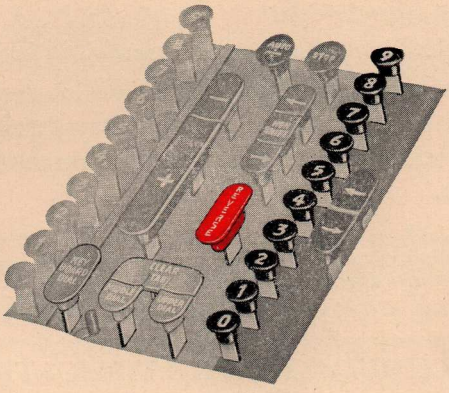
When factors are "written" around pre-set decimal points, the answer is automatically pointed off in both multiplication and division.

This simple Pre-Set Decimal System eliminates mental adding or subtracting by the operator. However, if it be desired to set decimals "by rule" instead of by this simple "lining-up" process, the usual rules apply as follows:

Number of Middle Dial decimal places *equals* number of Upper Dial places *plus* number of Keyboard Dial places, and

Number of Upper Dial places *equals* number of Middle Dial places *minus* number of Keyboard Dial places.

AUTOMATIC MULTIPLICATION



Multiplication on the *Silent Speed* Model M or CT-10M Marchant is the fastest known. The first factor is set up in the keyboard and checked for accuracy of entry in the Keyboard Dial. The second factor is then entered in the Single-Row Keyboard. Concurrently with entry the Marchant is doing the multiplying, so that upon entry of the final digit of the second factor the answer is instantly completed—appearing in the Middle Dial—*in a flash!* Correctness of entry of multiplier is checked in Upper Dial.

(1st Factor) *Multiplicand*		(2nd Factor) *Multiplier*		(The Answer) *Product*
45678	×	3456	=	157863168

Multiplicand: A number to be multiplied.

Multiplier: A number by which another is multiplied.

Product: The result of a multiplication.

Example: 45678 × 3456 = 157863168

With Red Carriage-Position Indicator above Dial "1" and Lower green Shift Control Key depressed, set-up 45678 in Keyboard Dial. Touch Keys of Single-Row Keyboard, first "6," then "5," then "4," and then "3." The Marchant writes the product, 157863168, in the Middle Dial, which is completed when the "3" is touched. (See next page for alternate method that is preferred by most operators.)

Or, with Red Carriage-Position Indicator above Dial "4," depress green Shift Control Key with arrow pointing to left. Set-up 45678 in Keyboard Dial and "write" 3-4-5-6 with keys of Single-Row Keyboard. This procedure is called "entering multipliers from-the-left."

Marchant's flexibility makes it easy to multiply in either direction.

The Marchant starts multiplying instantly with depression of the key for the first digit of the multiplier. You may "write" the multiplier ahead of the operation, for the Marchant will remember each digit and finish the problem.

On Model D or CT-10D use the Multiplier Bar to "build up" the multiplier in the Upper Dial, moving the carriage in either direction with Electric Carriage Shift Bars.

ACCUMULATIVE MULTIPLICATION

If, in the above examples, the Middle Dial had contained an amount, such as the answer of a preceding multiplication, the new product would have been added to the previous answer. This is useful in checking invoices or other types of work where it is unnecessary to prove the extension of each individual item. Much time is saved by allowing products to accumulate in the Middle Dial and checking only the total.

REVERSE OR *SUBTRACTIVE* MULTIPLICATION

Accumulative multiplication *adds* the new product to an amount which may be in the Middle Dial. Similarly, Reverse or Subtractive multiplication *deducts* the new product from an amount which may be in the Middle Dial.

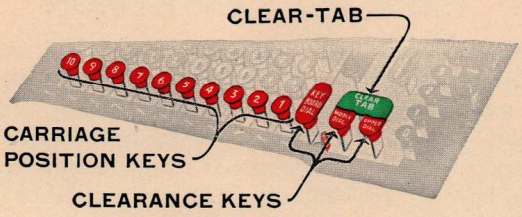
For reverse or subtractive multiplication, merely depress the red Reverse Bar before you depress the key of the Single-Row Keyboard.

If the Reverse Bar is inadvertently depressed, it may be released by depressing the Division Stop Key.

In reverse multiplication, the Upper Dial will show the complement of the multiplier unless the Upper Dial already contains an amount, in which case the multiplier will be subtracted from such amount. If the Upper Dial is clear and it is desired to have it indicate the true multiplier, the Manual Counter Control (see Page 13) should be moved toward the operator.

On Model D or CT-10D, reverse multiplication may be obtained by using the Short-Cut Bar, moving the carriage in either direction with Electric Carriage Shift Bars.

SELECTIVE CARRIAGE TABULATION—MODEL CT-10M



All multiplication as described on preceding pages may be done with equal facility on Model CT-10M but this model also provides special means for relieving the operator of the necessity of positioning carriage with the electric carriage shift keys, substituting automatic tabulation of carriage to the proper position for next multiplier entry.

Example:

Inventory	462	items	@	1.875 ea.	$ 866.25
	86¼	doz.	@	12.9525 per doz.	1117.15
	1068	items	@	.0875 ea.	93.45
	238	items	@	.5525 ea.	131.50
	168½	gross	@	2.625 per gross	442.31

Decimals: Upper Dial 2, Middle Dial 7, Keyboard Dial 5. Upper green Shift Key down.

1. Set up in Keyboard Dial first price (1.875) and depress No. 5 red Carriage-Position Key, which instantly tabulates carriage so red Carriage-Position Indicator points to 5th Upper Dial.

2. Glance at multiplier (462) and also note the relation of the first digit of the next multiplier (86.25) to the first digit of the multiplier to be entered, thinking "462—one to the right." Enter 462 in Single-Row Keyboard and, while glancing at dials to see if factors were entered properly, let a finger drop into the "notch" formed by the depressed No. 5 red Carriage-Position Key and feel along "one to the right" and make a partial depression (until it clicks) of the key that is "one to the right"; viz., the No. 4 Key.

3. Copy answer and touch Clear Tab Key as a part of the clearing of dials. The carriage automatically tabulates to the 4th position.

4. Set up in Keyboard Dial second price (12.9525) and glance at multiplier, similarly thinking of it as "86.25—two to the left." While checking dials on completion, let finger drop into the "notch" and feel along "two to the left," making the partial depression for the next multiplier (1068). The depressed Carriage-Position Key indicates the position to which carriage will tabulate when Clear Tab is next touched at time of clearing after copying answer for second problem, and so on for all problems.

USEFUL HINTS FOR MULTIPLYING WITH *SELECTIVE* CARRIAGE TABULATION

The routine outlined on Page 23, when once understood, enables the operator to proceed with unmatched speed and simplicity. Entry of Keyboard Dial factors (multiplicands) may be done while carriage is tabulating, if desired. No attention need be paid to decimals, except when checking dial readings, nor is it necessary to pause between entering each factor of a single multiplication. The second multiplication on Page 23, for example, is merely entered as if it were a single long factor, thus:

1-2-9-5-2-5—8-6-2-5

When the next multiplier has its left hand digit in the same position as that of previous multiplier, as in the 5th problem (see Page 23), read the fourth multiplier as "238—no change," which indicates that the red Carriage Position Key is to remain as in the fourth problem.

It will be noted that no time is lost in depressing the red Carriage Position Key corresponding to the position of left-hand digit of the next multiplier because it is done while the eyes are checking entry of factors in the dials. Then, after answer is copied, the carriage tabulates instantly in either direction to the desired position. It is not necessary for it to tabulate to an end position and then travel in an opposite direction to the required central position for starting calculation of the next problem. The Marchant Selective Carriage Tabulation saves the time lost by such "to-the-end and from-the-end" mechanisms.

PARTIAL SELECTIVE CARRIAGE TABULATION

When the successive multipliers are of uniform length at the left of decimal point, or differ only slightly and infrequently from a single length, some operators prefer to keep the red Carriage Position Key permanently depressed so the carriage will always tabulate to the position corresponding to the left hand digit of the average or of the longest multiplier.

If this method is followed, multipliers that are shorter than the setting are entered by prefixing one or more ciphers, and those that are longer require a limited shift by use of the lower Electric Carriage Shift Key.

CORRECTING ERRORS IF MADE BY OPERATOR WHEN ENTERING MULTIPLIER

Correction of improper settings of multiplier in the Single-Row Keyboard is just as simple as correcting multiplicand set-ups in the Keyboard Dial (see bottom of Page 16). As the multiplier is entered it appears instantly in Upper Dial. Regardless of whether the error of entry is noticed during or after complete entry of multiplier, the same simple method of correction applies. Point the Red Carriage-Position Indicator to the digit that is incorrect. If it is too small, depress the key of the Single Row Keyboard indexed for the amount that the dial reading is too low; thus, if dial reads 6 and it should read 8, depress "2" key. Similarly, if the dial reads 6 and it should be 3, depress the Reverse Bar and "3" key.

ILLUSTRATIVE PROBLEMS APPLYING TO MARCHANT MULTIPLICATION

Only a few problems are shown on the following pages. The Marchant is extremely versatile and capable of offering all of the short-cut methods that ordinarily prevail in the calculator art, and also contributing many more which its special construction renders exclusively.

Users are urged to take advantage of the free Marchant Method Service which suggests the best way to apply the Marchant to the types of calculating of any business.

In many of the problems to follow, the greatest number of decimals is five in the multiplicand and four in the multiplier. Decimals will therefore be set at 5 in Keyboard Dial and 4 in Upper Dial to accommodate these factors. Following the rules already given, the Middle Dial decimal will be set at 9, and such problems will be worked around those decimals. (See illustration below.)

Example:

75.25 × 2.125 = 159.90625
17.1225 × 25.125 = 430.2028125
136.255 × 536.1 = 73046.3055

The above three problems are calculated without change of the decimal markers. This illustrates the customary practice of calculating with reference to "pre-set" decimals. Oftentimes an entire day's work involving a wide variety of calculating can be handled by the use of a single pre-setting of decimals.

SUBTRACTING A PRODUCT BY REVERSE MULTIPLICATION

Example: (15.73 × 74) — (4.52 × 33) = 1014.86

Multiply 15.73 by 74. Clear Upper Dial and Keyboard Dial, and move Manual Counter Control toward the operator. Make the second multiplication "in reverse" by use of Reverse Bar and keys of Single-Row Keyboard, automatically subtracting the second product. This method is useful, for example, in calculating and simultaneously deducting freight allowance.

On Model D, use Short-Cut Bar for the second multiplication.

SHORT-CUT MULTIPLICATION

(Model D or CT 10D only)

The "Short-Cut" Bar (see Page 7) on the Model D Marchant is a distinct advantage and an added time saver. When digits higher than 6 appear in the multiplier, this Short-Cut method may be used.

Example: 318.6 × 87.6 — 27909.36

With carriage in fourth position, set 318.6 in Keyboard Dial around the decimal. Depress Short-Cut Bar until 0 in fourth position Upper Dial is reduced down to 6.

Shift to fifth position. Depress Short-Cut Bar twice, reducing 9 in Upper Dial to 7

Shift to sixth position. Depress Short-Cut Bar once, reducing 9 in Upper Dial to 8.

Shift to seventh position. With one stroke of Multiplier Bar the remaining 9's are eliminated from the dials, giving the answer, 27909.36, in Middle Dial.

DOUBLE MULTIPLICATION—INVOICE CHECKING

Two numbers may be multiplied by the same multiplier in one operation. In entering invoices of incoming merchandise, many stores show both cost and selling price on the invoice and require both columns to be extended.

Example:

Quantity	*Cost Price*	*Amount*	*Selling Price*	*Amount*
28	1.35	37.80	1.85	51.80
14	.87	12.18	.98	13.72
21	2.45	51.45	3.65	76.65
105	.45	47.25	.67	70.35
96	.33	31.68	.55	52.80

Set "Cost Price" at left of Keyboard Dial. Set "Selling Price" at right of Keyboard Dial, and multiply by the quantity indicated, obtaining simultaneously in Middle Dial the total cost at the left and the total selling price at the right. Pre-set decimals for both Keyboard Dial positions with corresponding double setting of Middle Dial decimals.

If all the items are to be charged to one department, it is not necessary that their respective amounts be listed. The totals of cost and selling price are then permitted to accumulate in Middle Dial, so upon completion only the total debits to department inventory at cost and retail are shown. The total cost debit also acts as a check of vendor's invoice, making it unnecessary to check it separately

This application may be easily modified to accommodate discounts, transportation, and proportionate surcharges. Mark-Up percentage for the entire invoice is also obtainable without complete re-setting.

ACCUMULATION OF MULTIPLIERS WITH PROOF OF EACH

A useful application frequently employed in invoicing is the simultaneous extension and totaling of items.

56 cases	@	4.62		On 10 column Marchant set decimals Upper Dial 0, Middle Dial 9 and 2, Keyboard Dial 9 and 2.
18 cases	@	9.24		
7 cases	@	3.22		
81			447.58	

Place "1" at extreme left of Keyboard Dial as a permanent setting. Set up 4.62 at right of Keyboard Dial and multiply by 56. Clear Upper Dial only Change Keyboard Dial at right to 9.24 and multiply by 18. Similarly clear Upper Dial, change Keyboard Dial at right to 3.22 and multiply by 7

Middle Dial shows at left the total number of cases and at right the total invoice.

If it is desired to show individual extensions, change procedure by clearing Middle Dial after each multiplication instead of clearing Upper Dial. Upon completion the Upper Dial will show Total Cases and the individual proof of each multiplier entry will appear in Middle Dial at the left.

MULTIPLICATION OF THREE OR MORE FACTORS

With all dials in perfect alignment, and complete carry-over to the full capacity of the carriage, the *Silent Speed* Marchant is ideally adapted to such problems:

Example: $413 \times 343 \times 565$ 80037335

With decimals at extreme right of dials, set up 413 in Keyboard Dial and multiply by 343. Result in Middle Dial is 141659. With carriage in first position, copy this result in Keyboard Dial, making visual comparison as dials are in perfect alignment. As a double check the Middle Dial may be cleared to ciphers by reverse multiplying by "1" (or touch Short-Cut Bar on Model D) If Middle Dial does not clear to ciphers, an error of transferring was made. Clear Upper Dial and multiply by 565.

Another useful method is to set 413 at left of Keyboard Dial and 343 at right, and multiply by 565. The product of 343 and 565 appears at right of Middle Dial. Clear the 343 from Keyboard Dial and build up Upper Dial reading until it equals the amount at right of Middle Dial. Perfect three dial alignment makes this easy. The answer appears at left of Middle Dial. This method is limited to cases in which the sum of the digits of all three factors does not exceed the capacity of Keyboard Dial. It is particularly useful if one factor is a constant, in which case the constant is set up at left of Keyboard Dial.

MULTIPLYING WHEN ONE FACTOR IS A CONSTANT

The Marchant has a separate keyboard for each of the factors of a multiplication, so it is unnecessary to provide complicated means for storing the constant while the second factor is being set up, as would be required if only one keyboard were available.

The constant is set up in Keyboard Dial (on some models there are means of locking it in place to prevent accidental clearance) Multiplication is then made by entering the variable second factors in the Single-Row Keyboard as multipliers, reading answers from Middle Dial, and clearing only Upper and Middle Dials upon completion of each problem. If the successive multipliers are similar it is often easier to convert one to another by building up or down in the Upper Dial. When the Upper Dial displays the new multiplier, the Middle Dial displays the new product.

In special cases when the constants are of only a few digits, and the variable factors have large numbers of digits, time may be saved by multiplying as in ordinary two-factor multiplication, setting the long variable factors in Keyboard Dial and multiplying each time by the short length constant.

PERCENTAGE PRO-RATING OR DISTRIBUTION

A frequent example of multiplying when one factor is a constant is in expense distribution

Example

Find percentage of department expense to total expense.

Monthly expense, department A	$ 125.00	4.14%
" " " B	250.45	8.29
" " " C	1255.55	41.55
" " " D	650.35	21.52
" " " E	740.25	24.50
	$3021.60	100.00%

By division (see Page 33) it is found that $1.00 of expense is .0330950% of $3021.60. The percent of expense for department A is obviously 125 × .0330950 or 4.14%. The factor .0330950 is set up in Keyboard Dial as a constant, and multiplied in turn by the departmental amounts, thus producing the percentages.

Sometimes it is desired to provide a control proof so that at end of computation the calculator shows the accumulated percentages (100.00) It is easy to do this on the Marchant, but inasmuch as such control proofs do not prove transcribing to the work sheet, it is obvious that true control requires that the amounts be added *after* transcribing. It is therefore believed undesirable to depend upon any machine proof control. The final additions after transcribing prove both transcribing and calculating.

SIMPLE DISCOUNT

Example:

Amount $535.50 Discount 15% Net $455.175

Multiply 535.50 by 1 (100%), using the "1" Key of Single-Row Keyboard. Then multiply by 15 in reverse, using Reverse Bar and keys of Single-Row Keyboard. The net amount of $455.175 appears in Middle Dial and the net percentage .85 in Upper Dial. The same result will be secured by multiplying 535.50 by .85 (100% — 15%)

On Model D use Multiplier Bar and Short-Cut Bar

Applying "Double Multiplication" to discounting (see Page 26), the amount of discount and net after its deduction may be obtained simultaneously

Example:

Amount	*Discount "off" 15%*	*Discount "on" 85%*
470.55	70.58	399.97 (the net)

This is useful when a number of items have the same discount. With suitable decimal set-up, the discount "off" (15) is set up at right of Keyboard Dial. The discount "on" (.85) is set up at the extreme left. Multiplying by each of the amounts in turn produces the amounts of discount at right of Middle Dial and net after deduction of discount at left.

CHAIN DISCOUNT

Example:

Find net amount of $465.75 less discount of 12½—5—2½%

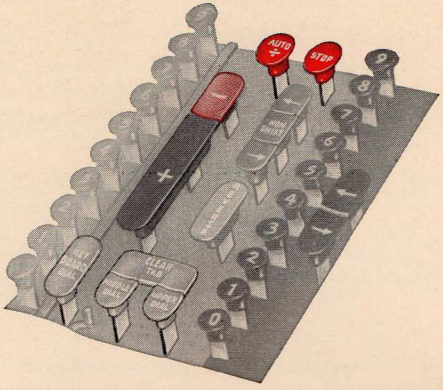
(With 4-9-5 decimal set-up as shown on Page 25)

Multiply 465.75 by 1. Clear Upper Dial. Move Manual Counter Control toward the operator. By Reverse Multiplication (see Page 25) "write" 125 in Upper Dial. Copy in Keyboard Dial from Middle Dial, 407.53125 Clear Upper Dial. By Reverse Multiplication "write" .05 in Upper Dial. Copy in Keyboard Dial from Middle Dial 387 15469 Clear Upper Dial. By Reverse Multiplication "write" .025 in Upper Dial. Net amount, $377.48, is in Middle Dial.

CHAIN DISCOUNT WHEN USING TABLES

The Decimal Equivalent of a Chain Discount is obtained by subtracting from "1" the net amount after deducting the chain discount from "1." Tables of the usual Chain Discounts, the decimal equivalents of the discounts, and of the complements of discounts, are available upon request. Multiplying any amount by the decimal equivalent of the chain discount gives the amount of discount, and similarly multiplying by the decimal equivalent of the complement of the chain discount gives the net after deduction of discount.

AUTOMATIC DIVISION



Marchant Automatic Division performs all division problems automatically and electrically at the touch of a key It gives instant results with unequalled simplicity and ease.

Definition of Terms:

Dividend: A number to be divided by another.
Divisor: A number by which another is divided.
Quotient: The result of a division.

Example:

Dividend	*Divisor*	*Quotient*
3928.45	31.6	124.318

Decimals. Upper Dial 3, Middle Dial 5, Keyboard Dial 2.

With carriage in 4th (units) position, set up 3928.45 in Keyboard Dial and touch Add Bar. On some models it is necessary to clear Upper Dial by touching either the Subtract Bar or the Upper Dial Clearance Key

Set up 31.6 in Keyboard Dial. Move carriage until the left-hand digit of the dividend is directly above the left-hand digit of divisor, the same as pencil and paper method.

Depress Automatic Division Key and the Marchant automatically completes the division, the quotient 124.318 appearing in True Figures in the Upper Dial, and the "remainder" (.0012) is left in the Middle Dial.

The dividend, in this case, is not equally divisible by the divisor, so the quotient appears with a decimal fraction which may be extended to as great a length as desired by arranging more decimal places in the Upper Dial and correspondingly increasing the decimal places of the Middle Dial (see Page 20)

DIVIDING WITH SELECTIVE CARRIAGE TABULATION

On Models CT-10M and CT-10D depress the red Carriage Position Key corresponding to the "units" position of Upper Dial, i. e., the position at the left of Upper Dial decimal marker Carriage will return to that position upon depression of Clear-Tab simultaneous with clearance, thus enabling setting up dividend and divisor without consideration of carriage position. This greatly simplifies any series of divisions.

PERFORMING A SERIES OF DIVISIONS WITHOUT LINE-UP OF LEFT-HAND DIGITS OF DIVIDEND AND DIVISOR

Successive divisions may proceed without the necessity of lining up left-hand digits of dividend and divisor, provided decimal markers are so placed that dividends and divisors are each set up around its own Keyboard Dial decimal. The example below illustrates this method as applied to models with Selective Carriage Control, though use of this method is not necessarily restricted to such models.

Example:

ENGINEERING ESTIMATES

	Dividend Cost	*Divisor Units*	*Cost per Unit*
Section A	64327.25	125.25	513.59
Section B	896.42	14.7	60.98
Section C	8372.84	8.55	979.28
Section D	3324.68	685.2	4.85

It will be noted that if any of the above divisors are laid over corresponding dividends so decimal points coincide, the dividends are longer than the divisors by 2, 1, 3, and 1 digit respectively The greatest of these is "3," which is designated "the spread."

Set Keyboard Dial decimal at 2 for entering dividends and at 5 for entering divisors. The "divisor decimal" is always at left* of the "dividend decimal" by an amount equal to the "spread." Locate Middle Dial decimal by applying procedure of Page 20, but using the "divisor decimal" of Keyboard Dial as the one from which Middle Dial decimal is lined up. The conditions of this problem require pointing off three decimal places in the Upper Dial, so the Middle Dial decimal is placed at 8. Next depress the red Carriage Position Key that will locate the Middle Dial decimal directly above the "dividend decimal" of the Keyboard Dial, in this case No. 7 This is a permanent setting and the carriage will always tabulate to 7th position at each clearance.

With such a setting, division can proceed without lining up left-hand digits, provided dividends are set around the 2nd Keyboard Dial decimal and divisors are set around the 5th Keyboard Dial decimal.

*If divisors are longer than dividends, the "spread' is negative so the "divisor decimal of the Keyboard Dial is located first. The "dividend decimal" is then placed to the left of it by an amount equal to the negative "spread."

OPTIONAL DIVISION STOP

Any time sufficient quotient appears, the division may be stopped by depressing the Stop Key To start division for additional quotient after it has once been stopped, hold down Stop Key just prior to depressing Division Key and release Stop Key just prior to releasing finger from Division Key

Models in which Upper Dial does not clear upon depression of Division Key require only that Division Key be depressed to re-start division.

FINDING PERCENTAGE

Example:

What per cent of $834.00 is $191.82?

Simply divide $191.82 by $834.00 and the result, .23 or 23%, appears in Upper Dial.

Regardless of how this type of problem is expressed, the "of" factor is always the divisor.

RECIPROCALS

When several items are to be divided by the same divisor, the reciprocal of the divisor may be used as a constant multiplicand. Multiplying this reciprocal by the item gives the same result as direct division.

The reciprocal of any number is found by dividing the unit "1" by that number

To find the reciprocal of 20 divide 1 by 20. The reciprocal is .05 The reciprocal of 16 is 1 divided by 16, or .0625.

Example:

Find the reciprocal of 47

To obtain an ample number of significant figures, shift carriage to the extreme right, place "1" in extreme left of Keyboard Dial and add. Clear Upper Dial (not necessary on models equipped with automatic clearance prior to division)

Place 47 in extreme left of Keyboard Dial. Depress Automatic Division Key The reciprocal is found to be .0212765957

Example:

432 ÷ 18166 =	.023781
2564 ÷ 18166 =	141143
3347 ÷ 18166 =	184245
3485 ÷ 18166 =	191842
4765 ÷ 18166	.262303
2581 ÷ 18166	142079
992 ÷ 18166	.054607
18166	1.000000

The reciprocal of 18166 is .0000550479.

Rule: A quick method of determining the decimal point in a reciprocal is to prefix to the significant figures of the reciprocal one less cipher than there are whole numbers in the divisor.

If the divisor is a decimal, point off in the reciprocal as many whole number digits, plus one, as there are initial ciphers in the divisor, e. g., the reciprocal of .005765 is 173.4605.

PERCENTAGE RECIPROCAL

Dividing, by multiplying the reciprocal of the constant divisor by the respective dividends, produces a true quotient, i. e., the ratio that the divisor bears to the dividend. When it is desired to have this ratio appear as a percentage, as in "Percentage Pro-Rating or Distribution" (see Page 28), the quotient may be expressed as a per cent, thus, in the example above, first item, 432 is .023781 of 18166, or it is 2.3781% of 18166.

In commercial computing it is customary to care for this extra two place pointing off by locating the decimal point of the reciprocal so that multiplying it by the amounts gives direct reading in percentages instead of as ratios. The rule is

If quotients are desired as percentages, place decimal in reciprocal two places to the right of its location as established by the regular reciprocal rule (see Rule at top of page)

Example:

The *Percentage* Reciprocal of 18166 (see example above) is .00550479.

For first item of example .00550479 × 432 equals 2.3781%.

To obtain a clear idea of the meaning of "Percentage Reciprocal," ask the question, "What per cent of the total amount is '1'?" The answer to this is the Percentage Reciprocal, and any other value differing from "1" is obviously the per cent of the total amount which is obtained when the Percentage Reciprocal is multiplied by that value.

PER CENT OF INCREASE OR DECREASE

Example

Compute the per cent of increase or decrease from Prior to Current Period:

June *Prior Period*	*July* *Current Period*	*Difference*	*Per Cent of* *Prior Period*
1421.25	1489.76	68.51	4.82%
1512.37	1456.26	—56.11	—3.71
897.21	2641.32	1744.11	194.39
2049.76	784.72	1265.04	—61.72
94.72	3247.91	3153.19	3328.96

Decimals: Upper Dial 5 (an extra marker is placed at 3 to enable reading in percentages instead of ratios), Middle Dial 7, Keyboard Dial 2. Upper green Shift Key down on M models.

Calculating can be done by taking the items as they come, or by checking all items that show a gain and calculating them first, following for those showing loss. The latter is somewhat faster, as the segregation can be made while divisions are proceeding.

For Increases:

With carriage in 6th position, set up Current Period amount in Keyboard Dial and add. (It is helpful to remember that the black key is touched, i. e., "black" for black figures, a gain.)

Similarly set up Prior Period amount and reverse multiply by "1." (It is helpful to remember that this operation has an opposite effect from the first.) Amount of Increase appears in Middle Dial if it be required. Depress Division Key * Per cent of Increase appears at 3rd decimal in Upper Dial.

For Decreases

As above, set up Current Period amount in Keyboard Dial and subtract. (It is helpful to remember that the red key is touched, i. e., "red" for red figures, a loss.)

Similarly set up Prior Period amount and multiply by "1." Amount of Decrease appears in Middle Dial if it be required.

Depress Division Key * Per cent of Decrease appears at 3rd decimal in Upper Dial.

If Amount of Increase or Decrease is not desired:

It is possible to divide without subtracting, thus having the Upper Dial produce a direct ratio which is read as a percentage. This procedure involves special interpretation depending upon whether or not there is a string of 9's at left of Upper Dial, etc. No time is saved by such procedure, as the mental interpretation of the result and the special manipulation to obtain it offset the time for the depression that produces the subtraction.

*In cases of large increases or decreases such as in the third and fifth examples, line up left digits prior to division (see Page 30)

DECIMAL EQUIVALENT OF FRACTIONS

When a table of Decimal Equivalents of Fractions is not available, a fraction may be expressed as a decimal by dividing the numerator by the denominator

Example:

Express as a decimal the fraction 5 64.

Assuming the decimal is to be carried to 4 places, point off 5 places in the Upper Dial, 5 places in the Middle Dial, and none in the Keyboard Dial. Then divide 5 by 64. A glance at the right hand digit of the Upper Dial shows it to be a "2," which being less than "5" indicates that the quotient to four places is .0781. If the right hand digit of the Upper Dial had been "5" or more, the last digit of the desired four-place quotient would have been "rounded upward" to the next higher digit. It will be noted that the "remainder fraction" in the Middle Dial and Keyboard Dial (32/64) equals one-half, showing the full decimal equivalent to be .078125

THE REMAINDER FRACTION AS A GUIDE TO ADJUSTING FINAL DIGIT

This example illustrates the "remainder fraction" which may be used instead of an extra place in the Upper Dial as an aid in adjusting final digit of the desired quotient. If the "remainder fraction" is greater than or equal to one-half, the right hand digit of the quotient is "rounded upward" to the next higher digit. If it is less than one-half the right hand quotient digit is not altered. Operators desiring to take advantage of this procedure need divide to one less place in the Upper Dial thus saving considerable time.

INTEREST

Interest may be computed on the *Silent Speed* Marchant in a number of different ways. A simple and universal formula easily used on the Marchant is:

$$\frac{\text{Principal} \times \text{Rate} \times \text{Days}}{360 \text{ (or } 365)}$$

Example:

Find the interest on $3,549.00 at 5% for 41 days (360 day basis)

(Decimals: Upper Dial 3, Middle Dial 5, Keyboard Dial 2.)

Multiply 3,549.00 by .05 and the result by 41. Clear Upper Dial and automatically divide by 360. The interest, $20.21, is correctly pointed off in Upper Dial.

Marchant Table 5 further simplifies this by giving "rate" divided by 360 or 365 as one factor, thus reducing the problem to multiplying Principal by Days and dividing by the Table Factor

This and many other tables will be gladly furnished, upon request, by your Marchant representative.

SIMULTANEOUS MULTIPLICATION AND DIVISION

A product formed by the multiplication of two factors which is to be divided by a third amount is best obtained on Models M and CT-10M by multiplying the two factors, permitting the product to remain in Middle Dial, and setting up the third amount as a divisor, producing the result in the Upper Dial without intermediate copying. Such a method is faster on these models than any of the usual means of performing a multiplication simultaneously with division.

On Models D and CT-10D time may be saved by such simultaneous methods, of which there are numerous varieties. One useful plan is

Grain Trade Application (using 10 column Marchant)

(This may be modified to account for "dockage" also)

34755 lb. (56 lbs. per bushel) corn at $.93 per bushel. Find selling price.

Decimals: Upper Dial 6 and 3, Middle Dial 11 and 5, Keyboard Dial 8, 5 and 2.

1. With carriage in 7th position, set up in Keyboard Dial 34755 with respect to 5th decimal and depress Subtract Bar

2 Set up 56. at 8th Keyboard Dial decimal and .93 at 2nd decimal. Touch X Bar until 9's at left of Middle Dial have cleared. Next depress division key

Selling price (577 18) appears in Middle Dial at right.

SPECIAL APPLICATIONS

Space does not permit reference to the many ingenious and useful ways in which the Marchant solves figure problems for every business. A few are listed to give a general idea of its scope and versatility Special Marchant Methods for such problems are available for the asking.

Retail: relating to the Retail Method of Accounting
Wholesale, Manufacturing, and Processing
Service Industries
Amusements
Life, Fire, and Casualty Insurance
Public Utilities
Transportation and Warehousing
Petroleum, Mining and Metallurgy, Lumber
Engineering and Contracting, Surveying
Federal, State, County, and Municipalities
Banks: Analysis, Accruals, Serial Loans, Savings Interest, Exchange
Financial Mathematics: Amortizations
Statistics: Correlations, Deviations, Least Squares
General Accounting: Payrolls, Pro-ration, Distribution
Basic Mathematics: Square, Cube, and Higher Roots; Direct and Inverse Straight-Line and Curvilinear Interpolation, Differencing

COPYING ANSWERS—CALCULATOR DESK ROUTINE

INTERNAL CHECK AND AUDIT SYSTEM

Wherever possible it will be advantageous to use the Double Entry Method of calculating. This gives data for future audit and also permits working from original data. In such procedure the Marchant becomes a part of the system of producing the reports or final data and not merely a side device that requires double checking before its results can be used.

DOUBLE ENTRY CHECK AND AUDIT PROCEDURE

Place media from which calculating data is obtained at left and Marchant at the right, and still further to its right (on separate stand if need be) the typewriter, biller, or device for preparing final report.

1. Note factors on media and calculate same. Copy answer back to media.

2. Read from Marchant's Three Dials all 3 Factors and copy them *from the dials* to the Final Report (invoice, voucher, or whatever it may be)

3. Pick up media and bring it to extreme right and visually compare it with the Final Report as written. Clear Marchant dials and repeat.

It will be observed that this routine checks *(a) Errors of entering wrong figures in Marchant from media, (b) Errors in copying back the answers from Marchant to the media, (c) Errors in posting from Marchant dials to Final Report.* The media with answers copied thereon are available for future audit.

SIMPLICITY OF OPERATION

As the Marchant does not require specially trained operators, it may be used by those who ordinarily do many other things. This permits decentralizing the calculating, spreading it among the sections where figures originate, thus reducing liability of error and improving efficiency of figure production because the Marchant is self-checking. It is not necessary to do the work twice on a Marchant. The three dials give a check of each factor as entered and Double-Entry calculating as described above proves posting and transcribing.

20 REASONS FOR

MARCHANT

"Silent Speed Supremacy"

Introduction

1. UNPRECEDENTED SILENT SPEED
2. SMOOTHLY FLOWING MECHANISM
3. ALL-ELECTRIC OPERATION
4. ONE-HAND KEYBOARD CONTROL

Carriage

5. AUTOMATIC TWO-WAY CARRIAGE SHIFT
6. SELECTIVE CARRIAGE TABULATION
7. RED CARRIAGE-POSITION INDICATOR
8. PRE-SET DECIMAL SYSTEM

Dials:

9. TRUE FIGURE DIALS FOR ALL 3 FACTORS
10. PERFECT 3-DIAL ALIGNMENT
11. COMPLETE CAPACITY CARRY-OVER
12. POSITIVE ELECTRIC CLEARANCE

The Accuracy Controller

Operation.

13. AUTOMATIC CONCURRENT MULTIPLICATION
14. AUTOMATIC COMPARISON DIVISION
15. AUTOMATIC COUNTER CONTROL
16. AUTOMATIC ADD & SUBTRACT BARS

General

17. FLEXIBLE SINGLE KEY DEPRESSION
18. ATTRACTIVE STREAMLINE APPEARANCE
19. CONVENIENT DESK PORTABILITY
20. PERMANENT DEPENDABLE DURABILITY

MARCHANT CALCULATORS

Printed in U.S.A.